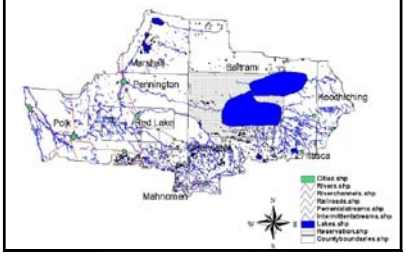
Red Lake Watershed District

Corey Hanson
Water Quality Coordinator

RLWD

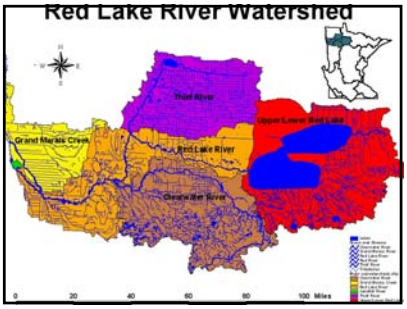


What is a Watershed District

- Local Unit of Government
  - Based on watershed of a body of water, doesn't follow political boundaries
  - RLWD covers significant portions of 6 counties and parts of 4 others
    - Main counties: Polk, Red Lake, Pennington, Marshall, Beltrami, Clearwater
    - Mahnomen, Roseau, Koochiching, and Itasca
- Formed through a petition to BWSR
- Governed by a Board of Managers
  - Managers are appointed by County Commissioners

Minnesota Watershed Districts

Red Lake River Watershed



Objectives of the Red Lake Watershed District

- Reduce Flooding
- Water Quality and Clean Lakes
- Provide and Conserve Water Supply
- Improve Drainage Systems
- Improve Stream Channels
- Reduce Soil Erosion
- Wild Rice Water Allocation
- Initiate Projects
- Administration and Public Relations

2003 RLWD Board of Managers

RLWD Board of Managers

- Red Lake – Orville Knott (President)
- Pennington – Dale Nelson (Vice President)
- Marshall – LeRoy Ose (Secretary)
- Beltrami – Lowell Smeby (Treasurer)
- West Polk – Robert Proulx
- East Polk – Alan Carlson (not pictured)
- Clearwater – Vernon Johnson

Staff and Responsibilities

- Administrator
  - District Office Supervisor
- Accounting/Secretary/Technician II
  - Bookkeeper
- Secretary/Accounting Asst.
  - Permits, filing, secretarial work
- Secretary/Receptionist
- Engineering Assistant
  - Provides technical engineering data and expertise for projects, permit inspections, ring-dike construction, ditch maintenance
- Technician II
  - Assists the Engineering Assistant, ditch inspector

Staff and Responsibilities

- Water Quality Coordinator
  - Water quality monitoring, project administration, water quality related studies and projects, advisory committees, grant applications, water quality modeling, data analysis, GIS
- Water Quality Technician
  - Riverwatch, assists water quality coordinator and engineering staff, data entry, GIS
- Summer Help –
  - Surveying, assist with drafting, permitting, and construction staking

Current Engineering Projects

- Project 60 – Grand Marais restoration, impoundments, wetland restorations
- Ditch 10 improvement near Red Lake Falls
- State Ditch 83 Improvement
- Monitoring flow in the Clearwater River – regulation of pumping by wild rice growers
- Ditch Inspection
- Impoundment maintenance
- Permitting
- Streamgauging

Ring Dikes

- Protect building sites from flooding.
- Cost share program
  - Landowner, RLWD, RRWMB, State

Stream Gauging

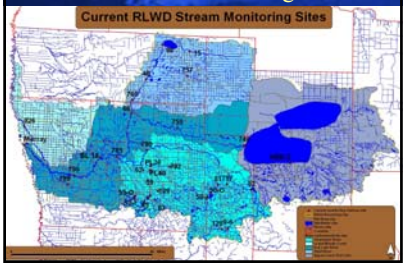
Impoundments

- Moose River, Parnell, Lost River Pool, Black River Dam, Baird, Beyer Dam, Good Lake

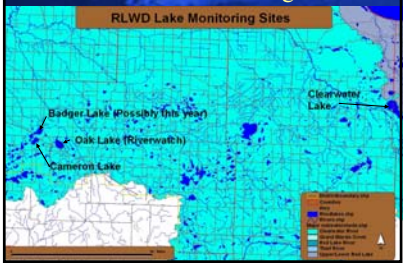
Current Water Quality Projects

- District Monitoring
  - Stream monitoring
  - Lake Monitoring
- Clearwater River Habitat/Bioassessment
- Red Lake River Corridor Enhancement
- TMDLs
- Red River Watershed Assessment Protocol
- Clearwater River Small Cities Stormwater Project
- Water Quality Team/Monitoring Advisory Committee – Red River Basin Planning
- County Water Planning and other advisory committees

District Monitoring



District Monitoring



Clearwater River Habitat/Bioassessment

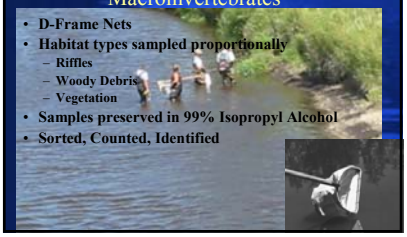
- Index of Biotic Integrity (IBI)
  - Scores a 100 meter reach of a river based upon a set of standardized metrics
  - Different Types of IBIs
    - Fish
    - Macroinvertebrate
    - Habitat
- Used EPA Rapid Bioassessment Protocols
  - http://www.epa.gov/owowwtr1/monitoring/rbp/
- Sampling conducted by the RLWD, Red Lake DNR, Beltrami SWCD

Clearwater River Habitat/Bioassessment – Fish

- Backpack electrofishers
- Fish identified, weighed, and counted
- Scores based upon # of natives, # of native darters, # of native sunfish, # of native suckers, # of intolerants, % of tolerants, % of omnivores, % of insectivores, % of piscivores, catch rate, % of hybrids, and % of abnormalities

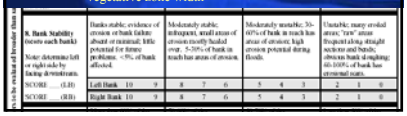
Clearwater River Habitat/Bioassessment Macroinvertebrates

- D-Frame Nets
- Habitat types sampled proportionally
  - Riffles
  - Woody Debris
  - Vegetation
- Samples preserved in 99% Isopropyl Alcohol
- Sorted, Counted, Identified



Clearwater River Habitat/Bioassessment

- Habitat Assessment
  - Scores based on 10 metrics
    - epifaunal substrate, embeddedness, velocity/depth regime, sediment depostion, channel flow status, channel alteration, frequency of riffles or bends, bank stability, vegetative protection, and riparian vegetative zone width

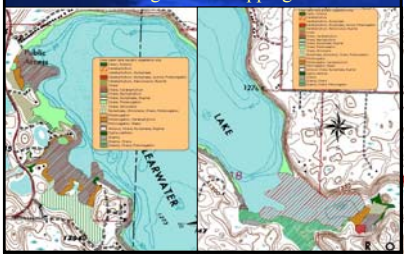


R. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. < 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ....(LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ....(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Clearwater River Habitat/Bioassessment – Zooplankton Sampling

- Plankton Net
- Preserved with 99% Isopropyl Alcohol
- Analyzed by MNDNR Aquatic Invertebrate Biology Lab

Clearwater River Habitat/Bioassessment – Vegetation Mapping

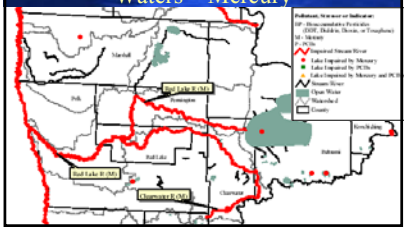


Red Lake River Corridor Enhancement

TMDLs In the RLWD

2004 Draft List of Impaired Waters – Conventional

2004 Draft List of Impaired Waters – Mercury



Methods for Determination of Impairment

- Based upon EPA standards for Minnesota Waters

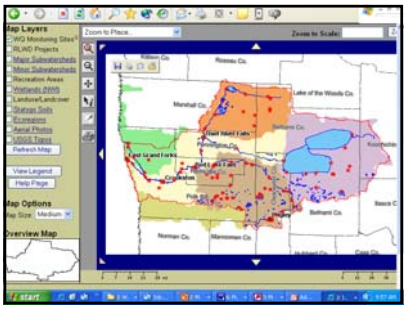
Parameter	MN Standard
Dissolved Oxygen	5 mg/l minimum
PH	6.5 – 8.5 allowable range
Conductivity	1,000 mg/l maximum
Chloride	100 mg/l maximum
Total Suspended Solids	25 mg/l maximum
Total Dissolved Solids	500mg/L
Sulfate	N/a
Fecal Coliform	200 colonies/100 ml

Learn More

- MPCA's TMDL Website
  - http://www.pca.state.mn.us/water/tmdl.html
- RLWD Website
  - www.redlakewatershed.org

Red River Watershed Assessment Protocol Project

- Statistical analysis, modeling, load calc
- Review present monitoring goals/network
- Coordination of water quality data among agencies
- Water quality report format
- Database clearinghouse, STORET entry
- Standard Operating Procedures (SOP)
- Quality Assurance Project Plan (QAPP)
- RLWD Website

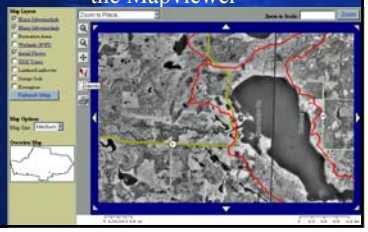


Available GIS Layers

Clearwater River Watershed

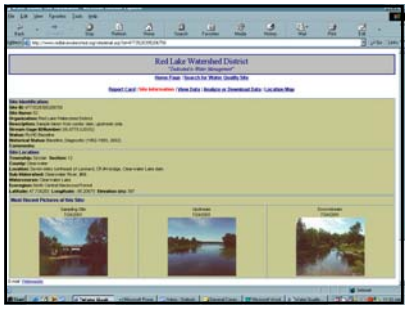
Site #52, Clearwater Lake Outlet

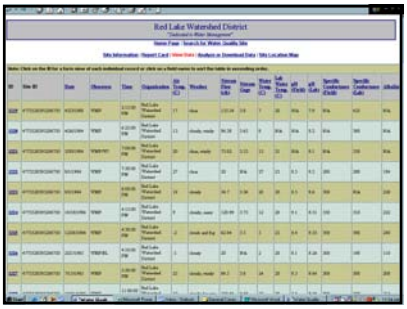
Finding Info About A Site Using the Mapviewer

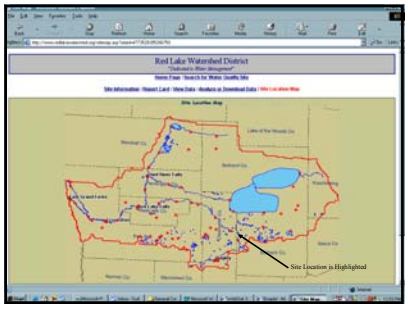


Search Results for "52"

Click Here





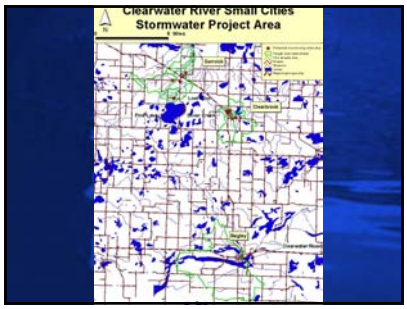


Standard Operating Procedures

- A set of standard operating procedures for all monitoring within the Red River Basin
- Covers all types of monitoring – sample collection, field parameters, mercury and H2S sampling, flow monitoring, IBI methods, equipment maintenance, and safety
- Interchangeable data from multiple sources
- Downloadable from website
- http://www.redlakewatershed.org/waterquality/Entire%20SOP%20Document.pdf

Clearwater River Small Cities Stormwater Project

- Implement stormwater retention projects in the towns of Clearbrook and Gonvick and add sediment traps and BMPs to Bagley's recently constructed stormwater retention system.
- 1st Step: Conduct a study to determine the type, size, and locations of stormwater ponds.
  - P8 stormwater modeling program
- Monitor water quality upstream and downstream of each town, as well as stormwater runoff. Continue to monitor after the project in order to determine effects of stormwater retention



Clearwater River Small Cities Stormwater Project

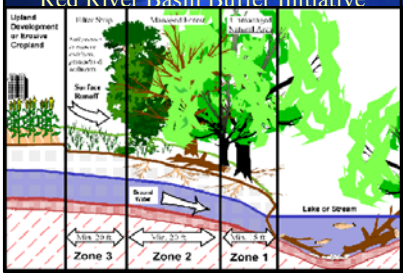
- Funding
  - Red Lake Watershed District is conducting the water quality/stormwater modeling project as an in-kind contribution
  - Applied for 319 Grant (50% Grant 50% Match)
    - Unsuccessful this year (no published TMDL reports)
  - Clearwater Watershed Initiative Grant

Red River Basin Buffer Initiative

- Focus on three small, priority watersheds within the Red River Basin
  - Silver Creek (Clearwater County)
  - Sand Lake (Becker and Clay Counties)
  - Whiskey Creek (Wilkin County)
- Local SWCD staff implement riparian buffer strips (as many acres as possible) within the watershed
- Easements paid for through CRP program (and possibly CREP)
- Water quality monitoring to monitor project success

Red River Basin Buffer Initiative

Red River Basin Buffer Initiative

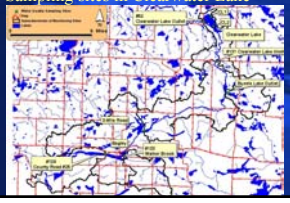


Recently Completed Water Quality Projects

- Clearwater Lake Water Quality Model
- Clearwater Lake Management Plan
- Clearwater River Bank Stabilization/Grade Stabilization Project
- Lost River Erosion Control Project
- Bagley Urban Runoff Project

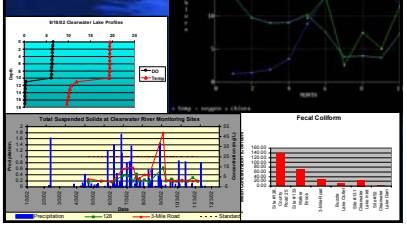
Clearwater Lake Water Quality Model

- Water Quality Monitoring on 6 sites in the Clearwater River and its tributaries in 2002
- 2 Sampling sites in Clearwater Lake



Clearwater Lake Water Quality Model

- Data Analyzed using Excel, FLUX, PROFILE, and BATHTUB.



Clearwater Lake Water Quality Model

- Trophic state of Clearwater Lake has improved since 1997
- Trout stream reach of the Clearwater River is no longer impaired for fecal coliform
- Clearwater River near Bagley impaired for DO
- Walker Brook impaired for DO
- Effects of load reductions in the watershed on TSI levels in the lake
- Examined possible sources of water quality problems observed during the study
- View or download on our website's projects page http://www.redlakewatershed.org/projects.html

Clearwater Lake Management Plan

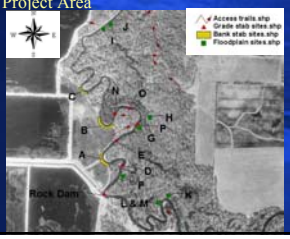
- Clearwater Lake Area Association
- Watershed Maps
- History of the lake
- Parcel-based database
- Water Quality Report from Clearwater Lake Water Quality Model Study
- Property Owners Survey
- Vision Statement, goals, action steps, plans for future evaluations

Clearwater River Bank/Grade Stabilization Project

- Clearwater Co., Greenwood Twp., Section 27
- Stream bank Stabilization
- Grade Stabilization
- Floodplain Restoration
- Partially funded by an EPA 319/CWP Grant - $134,500
- $269,000 total budget for engineering and construction

Clearwater River Bank/Grade Stabilization Project

- Project Area



Clearwater River Bank/Grade Stabilization Project

- Stream bank Stabilization – Erosion Before Construction

Clearwater River Bank/Grade Stabilization Project

- Stream bank Stabilization Construction

Clearwater River Bank/Grade Stabilization Project

- Stream bank Stabilization – Photo Monitoring, Fall 2003

Clearwater River Bank/Grade Stabilization Project

- Floodplain Restoration

Clearwater River Bank/Grade Stabilization Project

- Grade Stabilization
- Rock Riffles
- Cross-vane weirs

Lost River Erosion Control Project

- Polk County, Gully Township, Section 6
- Erosion near bridge and along bend in river upstream of channelized reach
- Installed cross-vane weirs and stream barbs (similar to bendway weirs and j-hook dams)

Lost River Erosion Control Project Area

Lost River Erosion Control Project

- Erosion Problems

Lost River Erosion Control Project

- Cross- Vane Weir

Lost River Erosion Control Project

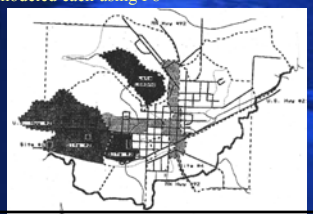
- Stream Barbs

Bagley Urban Runoff Project

- Cost-share project involving the City of Bagley, MNDOT, RLWD, and the North Central Minnesota SWCDs' Joint Powers Board.
- Designed to reduce TSS loads from the city by 82% and TP loads by 47%
- Result of the Developing and Implementing Strategies to Mitigate Urban Runoff to Surface Waters in Three Communities study

Bagley Urban Runoff Project

- Study split the city into subwatersheds and modeled each using P8



Bagley Urban Runoff Project

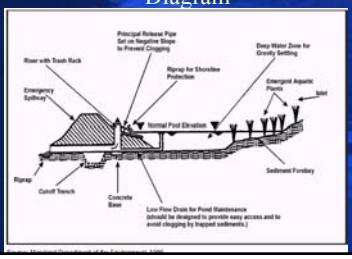
- **Modeled load reductions from each subwatershed as well as location, size, and type of stormwater retention**

Projected Total Suspended Solids and Total Phosphorus Loads, Before and After Treatment

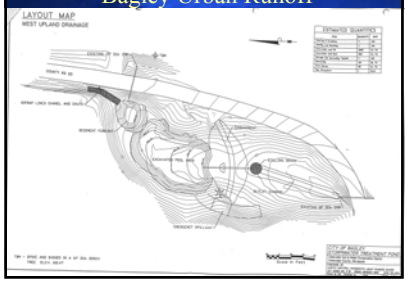
	No Treatment				After Recommended Treatment				Percent Load Reduction	
Subwatershed	Total Suspended Solids (pounds)	TSS (tons)	Total Phosphorus (pounds)	TP (tons)	Total Suspended Solids (pounds)	TSS (tons)	Total Phosphorus (pounds)	TP (tons)	TSS	TP
SPRDCB	11,436	179	33	0.51	8,149	9	21	0.03	45%	34%
GLS	17,433	141	62	0.43	1,781	17	80	0.08	90%	85%
HC	4,130	154	12	0.45	2,957	81	9	0.34	48%	23%
NWR	5,699	143	17	0.43	498	12	3	0.07	91%	83%
SLT	4,840	145	16	0.43	78	2	1	0.02	98%	96%
HP	6,575	154	25	0.46	530	6	5	0.03	90%	81%
CGR	6,342	160	18	0.47	409	11	2	0.06	93%	87%
NR	4,140	138	12	0.42	92	3	1	0.02	97%	94%
CC	14,876	134	44	0.46	2,723	37	11	0.11	81%	74%
GNG	9,362	150	28	0.45	1,600	24	7	0.11	82%	73%
VEA	1,275	133	4	0.41	41	4	1	0.03	97%	82%
IPD	2,066	140	6	0.44	62	4	1	0.03	97%	83%
SGC	2,339	261	6	0.70	429	48	2	0.02	82%	72%
FCEB	1,087	138	3	0.42	16	1	1	0.01	88%	94%
Totals	93,648		275		16,005		145		82%	47%

Bagley Urban Runoff Project - Map

Bagley Urban Runoff Project – Diagram



Bagley Urban Runoff



Bagley Urban Runoff Project - Construction

Proposed/Future Projects

- Clearwater River Watershed Initiative
  - Implement Recommendations of the Clearwater Nonpoint Study
    - Stormwater Retention
    - Wild Rice BMPs
    - Erosion Control Projects
    - Feedlot Inventory and BMP Implementation
    - Riparian Buffer Strips

Job Opportunities

- Summer help
- Job Openings posted on website
- http://www.redlakewatershed.org/employment.html

The End

- The RLWD District Office is open Monday thru Friday, 8:00 A.M. to 4:30 P.M.
- 102 North Main Avenue
  P.O. Box 803
  Thief River Falls, MN 56701
- Ph. 218-681-5800
  Fax. 218-681-5839
- www.redlakewatershed.org